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AQUATIC INVERTEBRATES AND HABITAT OF NORTH FORK WARM SPRINGS CREEK

July 21, 2000

A report to the Montana Department of Environmental Quality
by

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December 2001

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INTRODUCTION

This report summarizes data generated from a single aquatic invertebrate sample taken near the mouth of North Fork Warm Springs Creek, just above the USFS boundary. The sample site was located by GPS reading at 46°25'14"N, 111°56'20"W. The sample was collected by personnel of the Montana Department of Environmental Quality (MT DEQ) using the sampling protocol recommended by Bukantis (1998). In addition to the benthic sample, habitat parameters were evaluated using the "Macroinvertebrate Habitat Assessment Field Form" for streams with riffle/ run prevalence. Analysis of invertebrates was accomplished by applying the method recommended by Bollman (1998) for streams of western Montana. The method uses a multimetric battery to evaluate disturbance to biotic integrity. A thorough description of the analytic protocol and rationale for its application may be found in numerous reports to MT DEQ by this author.

RESULTS AND DISCUSSION

Table 1 itemizes the evaluated habitat parameters and shows the assigned scores for each. Habitat conditions were judged sub-optimal; benthic substrate diversity was

Table 1. Stream and riparian habitat assessment for a site on North Fork Warm Springs Creek. July 21, 2000.

Max. possible score	Parameter	NF Warm Springs Creek
10	Riffle development	10
10	Benthic substrate	7
20	Embeddedness	13
20	Channel alteration	20
20	Sediment deposition	8
20	Channel flow status	15
20	Bank stability: left / right	6 / 6
20	Vegetated zone: left / right	5 / 5
20	Riparian zone width: left / right	7 / 7
160	Total	109
	Percent of maximum CONDITION*	**68** **SUB-OPTIMAL**

*Condition categories: Optimal > 80% of maximum score; Sub-optimal ; 75 - 56%; Marginal 49 - 29%; Poor <23%. Adapted from Plafkin et al. 1998.

judged to be sub-optimal, and larger substrate was about 30% embedded by sand. Moderate fine sediment deposition was reported. Cow trampling and trails resulted in some erosion on streambanks and vegetative protection was judged marginal. The riparian zone width was somewhat abbreviated.

Bioassessment results are given in Table 2. When this bioassessment method is applied to these data, scores indicate that this site on North Fork Warm Springs Creek fully supports designated uses and sustains a benthic assemblage with essentially unimpaired biotic health.

Table 2. Metric values, scores, and bioassessment for a site on North Fork Warm Springs Creek. July 21, 2000.

	N.F.Warm Springs Creek
METRICS	**METRIC VALUES**
Ephemeroptera richness	6
Plecoptera richness	5
Trichoptera richness	6
Number of sensitive taxa	5
Percent filterers	4
Percent tolerant taxa	6
	METRIC SCORES
Ephemeroptera richness	3
Plecoptera richness	3
Trichoptera richness	3
Number of sensitive taxa	3
Percent filterers	3
Percent tolerant taxa	2
TOTAL SCORE (max.=18)	17
PERCENT OF MAX.	**94**
Impairment classification*	**NON**
USE SUPPORT †	**FULL**

The taxonomic and functional composition of the sampled assemblage can be further interpreted. Other useful metrics appear in the appendix to this report.

Six mayfly taxa were collected at this site, suggesting that water quality was good. The biotic index value (4.48) seems high for a montane stream, but the calculation was skewed by the abundance of the dominant taxon, which was the midge *Micropsectra* spp. This animal is ubiquitous in western streams, and the genus is rich in species, some of which are more sensitive than others. The high biotic index value (7) assigned to the taxon may thus confound the calculation. Overall taxa richness and the abundance of sensitive taxa lend strength to the hypothesis that water quality does not limit biotic integrity at this site.

Small-scale instream habitats appear to be intact, judging by the richness of the caddisfly fauna (6) and the number of "clingers" (14) present in the sample. Fine sediment deposition probably does not compromise hard benthic surfaces here. A diverse assemblage and the presence of at least 6 predator taxa suggest that unimpaired habitats are plentiful.

Reach-scale habitat also appears to be essentially intact, since 5 stonefly taxa were collected at the site. They include the sensitive cold-stenotherms *Visoka cataractae* and *Doroneuria* sp. Five long-lived taxa were present, suggesting that dewatering or other seasonal catastrophes do not regularly abort life cycles here.

CONCLUSION

- Taxonomic and functional composition of the sample taken at North Fork Warm Springs Creek suggest that habitat and water quality were essentially undisturbed.

LITERATURE CITED

Bollman, W. 1998. Improving Stream Bioassessment Methods for the Montana Valleys and Foothill Prairies Ecoregion. Unpublished Master's Thesis. University of Montana. Missoula, Montana.

Bukantis, R. 1998. Rapid bioassessment macroinvertebrate protocols: Sampling and sample analysis SOP's. Working draft, April 22, 1997. Montana Department of Environmental Quality. Planning Prevention and Assistance Division. Helena, Montana.

APPENDIX

Taxonomic data and summaries

North Fork Warm Springs Creek

July 21, 2000

Aquatic Invertebrate Taxonomic Data

Site Name: North Fork Warm Springs Creek

Site ID: NW-3 7/21/2000

Approx. percent of sample used: 20

Taxon	Quantity	Percent	HBI	FFG
Polycelis coronata	3	1.01	4	CG
Sphaeriidae	1	0.34	8	CG
Acari	1	0.34	5	PA
Total Misc. Taxa	**5**	**1.68**		
Baetis tricaudatus	6	2.01	6	CG
Diphetor hageni	1	0.34	5	CG
Drunella coloradensis	1	0.34	0	CG
Serratella tibialis	10	3.36	2	CG
Cinygmula sp.	1	0.34	4	SC
Epeorus sp.-early instar	1	0.34	0	SC
Total Ephemeroptera	**20**	**6.71**		
Sweltsa sp.	1	0.34	1	PR
Visoka cataractae	1	0.34	0	SH
Zapada cinctipes	31	10.40	2	SH
Zapada columbiana	4	1.34	2	SH
Doroneuria sp.	7	2.35	1	PR
Total Plecoptera	**44**	**14.77**		
Arctopsyche grandis	3	1.01	1	PR
Micrasema sp.	19	6.38	1	MH
Glossosoma sp.	1	0.34	1	SC
Apatania sp.	3	1.01	1	SC
Rhyacophila Angelita Gr.	1	0.34	0	PR
Rhyacophila Brunnea Gr.	2	0.67	1	PR
Total Trichoptera	**29**	**9.73**		
Heterlimnius sp.	17	5.70	4	CG
Narpus sp.	2	0.67	4	CG
Optioservus sp.	11	3.69	4	SC
Total Coleoptera	**30**	**10.07**		
Glutops sp.	3	1.01	3	PR
Simulium sp.	13	4.36	6	CF
Total Diptera	**16**	**5.37**		
Brillia sp.	2	0.67	5	SH
Eukiefferiella Devonica Gr.	1	0.34	4	OM
Eukiefferiella Gracei Gr.	8	2.68	4	OM
Micropsectra sp.	121	40.60	7	CG
Orthocladius sp.	1	0.34	6	CG
Pagastia sp.	18	6.04	1	CG
Parametriocnemus sp.	2	0.67	5	CG
Tvetenia sp.	1	0.34	5	CG
Total Chironomidae	**154**	**51.68**		
Grand Total	**298**	**100.00**		

Aquatic Invertebrate Summary Data

Site Name: North Fork Warm Springs Creek

Site ID: NW-3 7/21/2000

TOTAL ABUNDANCE	298
Ephemeroptera + Plecoptera + Trichoptera (EPT) abundance	93
TOTAL NUMBER OF TAXA	33
Number EPT taxa	17

TAXONOMIC GROUP COMPOSITION

GROUP	#TAXA	ABUNDAN	PERCENT
Misc. Taxa	3	5	1.68
Odonata	0	0	0.00
Ephemeroptera	6	20	6.71
Plecoptera	5	44	14.77
Hemiptera	0	0	0.00
Megaloptera	0	0	0.00
Trichoptera	6	29	9.73
Lepidoptera	0	0	0.00
Coleoptera	3	30	10.07
Diptera	2	16	5.37
Chironomidae	8	154	51.68

RATIOS OF TAX GROUP ABUNDANCES

EPT/Chironomidae	0.60

FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION

GROUP	#TAXA	ABUNDAN	PERCENT
Predator	6	17	5.70
Parasite	1	1	0.34
Collector-gatherer	13	184	61.74
Collector-filterer	1	13	4.36
Macrophyte-herbivore	1	19	6.38
Piercer-herbivore	0	0	0.00
Scraper	5	17	5.70
Shredder	4	38	12.75
Xylophage	0	0	0.00
Omnivore	2	9	3.02
Unknown	0	0	0.00

RATIOS OF FFG ABUNDANCES

Scraper/Collector-filterer	1.31
Scraper/(Scraper + C.filterer)	0.57
Shredder/Total organisms	0.04

CONTRIBUTION OF DOMINANT TAXA

TAXON	ABUNDANCE	PERCENT
Micropsectra sp.	121	40.60
Zapada cinctipes	31	10.40
Micrasema sp.	19	6.38
Pagastia sp.	18	6.04
Heterlimnius sp.	17	5.70
SUBTOTAL 5 DOMINANTS	206	69.13
Simulium sp.	13	4.36
Optioservus sp.	11	3.69
Serratella tibialis	10	3.36
Eukiefferiella Gracei Gr.	8	2.68
Doroneuria sp.	7	2.35
TOTAL DOMINANTS	255	85.57

SAPROBIC INDICES

Hilsenhoff Biotic Index	4.48

DIVERSITY MEASURES

Shannon H (loge)	2.01
Shannon H (log2)	2.90
Evenness	0.58
Simpson D	0.16

COMMUNITY VOLTINISM ANALYSIS

TYPE	ABUNDANCE	PERCENT
Multivoltine	125	41.86
Univoltine	131	44.04
Semivoltine	42	14.09

	#TAXA	ABUNDANCE	PERCENT
Tolerant	2	17	5.70
Intolerant	5	18	6.04
Clinger	14	85	28.52